2002 Annual Compliance Report
Falls City, Texas, Disposal Site

Compliance Summary

The site, inspected on January 16, 2002, was in excellent condition. Scattered small trees and bushes that colonized the side slopes of the disposal cell have largely been eliminated. Results of ground water monitoring were consistent with results from previous years and indicate essentially steady-state conditions. Other than ongoing management of the grass and side slope vegetation, and minor fence repairs, inspectors identified no requirement for additional maintenance or a follow-up or contingency inspection.

Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Falls City, Texas, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan for the Falls City, Texas, Disposal Site* (DOE/AL/62350–187, Rev. 3, U.S. Department of Energy [DOE], Albuquerque Operations Office, July 1997) and in procedures established by the DOE Grand Junction Office to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 5–1. Additional ground water monitoring began in accordance with the Ground Water Compliance Action Plan, which received concurrence from the U.S. Nuclear Regulatory Commission on September 18, 1998. Provisions of the Ground Water Compliance Action Plan will be incorporated into the Long-Term Surveillance Plan.

Table 5–1. License Requirements for the Falls City, Texas, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Sections 6.0 and 10.0	Section 1.0
Follow-up or Contingency Inspections	Section 7.0	Section 2.0
Routine Maintenance and Repairs	Section 8.0	Section 3.0
Ground Water Monitoring	Section 5.0 and the GCAP[a]	Section 4.0
Corrective Action	Sections 5.0 and 9.0	Section 5.0

[a]Ground Water Compliance Action Plan dated March 19, 1998

Compliance Review

1.0 Annual Inspection and Report

The site, east of Falls City, Texas, was inspected on January 16, 2002. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 5–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

1.1 Specific Site Surveillance Features

Access Road, Entrance Gate, Fence, and Signs—Access to the site is through a vehicle gate directly off of a public right-of-way (Farm-to-Market Road 1344). The main entrance gate and another vehicle gate on the same side of the property were in excellent condition but were not locked.

A barbed wire fence set on the property boundary encompasses the site. The fence predates cell construction and is corroding, but generally was in good condition except along the northwest boundary where it leans outward above a steep bank. The fence appeared to be sufficiently stable at this position to keep cattle out, and there was no indication that livestock has ever entered the site. A deer trail was present near perimeter sign P35 where a fence strand was broken.

The entrance sign, located at the main entrance gate, was in excellent condition. There are 64 perimeter signs along the site boundary. All signs were present and in good condition. Perimeter sign P43 had slipped down the post to the ground and was repositioned during the inspection.

Site Markers and Monuments—The two site markers, three survey monuments, and two boundary monuments were in excellent condition.

Monitor Wells—The 12 wells in the cell performance and ground water compliance monitoring networks were locked and in excellent condition.

1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into three areas referred to as transects: (1) the top and side slopes of the disposal cell; (2) the site perimeter; and (3) the outlying area.

Top and Side Slopes of the Disposal Cell—The top of the disposal cell is covered with well-established coastal Bermuda grass and was in excellent condition. The grass is cut and baled by a local farmer. There are no trees or woody shrubs on top of the disposal cell; grass cutting appears to be an effective control of these plants. Some woody species have established along the edge of the transition zone (PL–1) where the grass is not cut because of proximity to the riprap. These shrubs were cut and herbicide was applied to the stumps.

5A

Small amounts of fractured riprap were observed along the side slopes, as also noted during previous inspections. It has not been determined if the fractured riprap is an artifact of quarrying and placement or an indication of rock degradation. If subsequent inspections indicate that rock degradation may be occurring, implementation of a formal monitoring program will be evaluated.

Small scattered trees and bushes that had established on the side slopes were mostly absent. Inspectors sprayed the plants with herbicide in previous years and a local farmer was contracted to eradicate the perennial plants. Greasewood and similar species are concerns because they are deep-rooted. Most vegetation was dead including annual plants and most woody species; however, new growth on some previously treated plants was observed (PL−2). Vegetation control will continue on the side slopes.

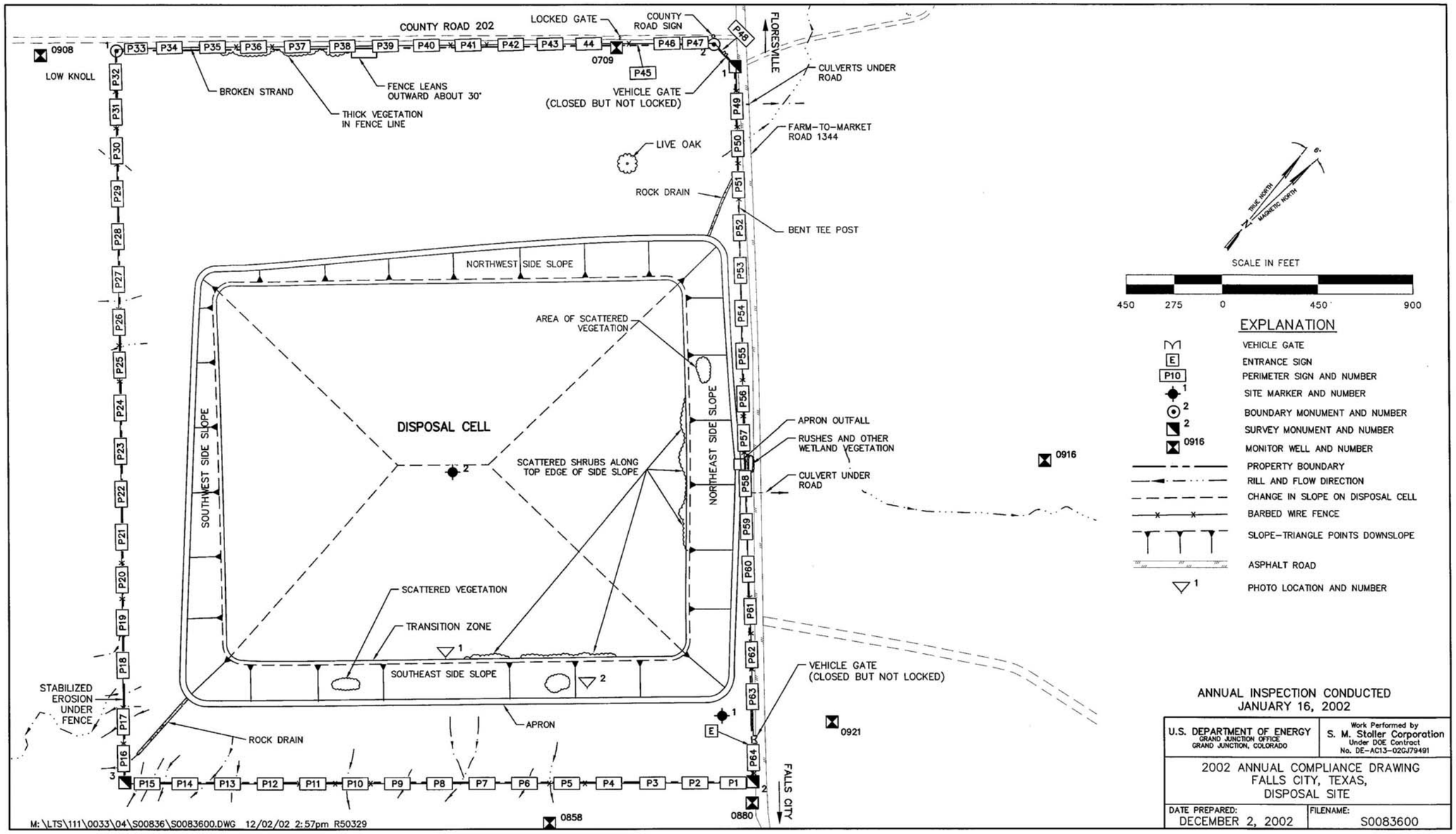

Figure 5–1. 2002 Annual Compliance Drawing for the Falls City, Texas, Disposal Site

Site Perimeter—The area between the fence and the toe of the disposal cell is covered with well-established grass, primarily Kleingrass, with some coastal Bermuda grass. Coverage was good and the turf appeared healthy and well cared for. Grass is managed by cutting and baling two or three times each year, depending on the weather. The cutting and baling process is clean and thorough, and appears to be an effective control against the growth of trees or other woody plants. A swath of grass was left uncut along the fence and also along rock drains, and around some of the as-built features, such as the site markers.

Water was standing at the north end of the north rock drain, and at the south end of the south rock drain. As noted in previous years, grass is growing in both drains but not in the apron outfall. The rock drains appeared to be functioning properly despite the grass encroachment but will continue to be monitored.

Minor gullies located south of the disposal cell were all shallow and stabilized by grass. Gully erosion is no longer considered a problem at the site.

Outlying Area—The area outward for a distance of 0.25 mile from the site boundary was visually inspected. No development or disturbance that could affect the site was observed.

2.0 Follow-Up or Contingency Inspections

No follow-up or contingency inspections were required in 2002.

3.0 Routine Maintenance and Repairs

A perimeter sign was resecured at its proper position on its signpost. Woody plants along the transition zone between the cell top and the side slopes were cut down and their stalks were treated with herbicide. As an annual maintenance item, grass on the cell top and between the cell and the perimeter fence was cut and baled by a local farmer.

4.0 Ground Water Monitoring

DOE monitors ground water at the Falls City site for two purposes. Ground water is monitored in the uppermost aquifer to demonstrate the initial performance of the disposal cell. DOE also monitors ground water downgradient of legacy plumes of contaminated ground water to ensure that users are not exposed to processing-related hazardous materials. The monitor well network is shown on Figure 5–2.

5B

Cell Performance Monitoring—The cell performance monitoring network consists of seven wells (0709, 0858, 0880, 0906, 0908, 0916, and 0921) completed in the Conquista and Deweesville sandstone units, which together constitute the uppermost aquifer. Wells 0908 and 0916, completed in the unsaturated zone of the Conquista Sandstone, are dry and have never produced samples—these wells are used only to detect a rise in the water table. The other five wells are sampled twice each year.

As stipulated in the original Long-Term Surveillance Plan, samples are analyzed for 10 analytes, all with maximum concentration limits established by the U.S. Environmental Protection Agency in Table 1 to Subpart A of 40 CFR 192 (Table 5–2).

Table 5–2. Cell Performance Analytes and Standards for the Falls City, Texas, Disposal Site

Analyte	MCL[a]	Analyte	MCL[a]
Arsenic	0.05 mg/L	Nitrate (as N)	10 mg/L[b]
Cadmium	0.01 mg/L	Selenium	0.01 mg/L
Chromium	0.05 mg/L	Uranium	0.044 mg/L
Lead	0.05 mg/L	Radium-226+228	5 pCi/L
Molybdenum	0.10 mg/L	Gross alpha	15 pCi/L

Note: mg/L = milligrams per liter; pCi/L = picocuries per liter
[a]MCL = Maximum concentration limit established in 40 CFR 192.
[b]The standard of 10 mg/L for nitrate as N is equivalent to a concentration of 44 mg/L for nitrate as NO_3. Nitrate as NO_3 is the analyte measured for this site.

Monitoring for these analytes is now understood to be an ineffective and inappropriate means to monitor the initial performance of the disposal cell. Ground water at the site is in contact with naturally occurring uranium deposits and associated minerals. Water that might leach from the disposal cell, either through transient drainage or percolation of precipitation through the cover, will be chemically similar and perhaps indistinguishable from naturally occurring ground water contaminated by minerals and human activities (mining, milling, and mineral exploration).

The Long-Term Surveillance Plan identifies pH as the indicator parameter for cell performance monitoring on the basis of tailings pore-fluid chemistry. However, legacy plumes typified by low pH exist beneath the cell in a ground water mound created by infiltration from historical tailings impoundments and mill effluent discharges. These plumes would be expected to spread outward as the ground water seeks an equilibrium level; however, buffering mechanisms caused by interaction of low pH waters and formation materials are expected to limit plume extent. The pH of the ground water samples collected in 2001 and 2002 was essentially unchanged and consistent with previous results for all wells (Figure 5−3).

Analytical results from 2002 are consistent with previous results and what would be expected of ground water contaminated by uranium mineralization. Of the 10 analytes, concentrations of arsenic, cadmium, selenium, and uranium, and activities of radium and gross alpha, continue to exceed their respective standards in several wells. Uranium concentrations, though near or below the standard in most wells, continue to increase well above the standard in monitor well 0880 (Figure 5–4). This increase in concentration may be an indication of a legacy plume spreading outward as expected.

Water level measurements from the monitor wells indicate that the elevation of the water table has generally dropped several feet since the disposal cell was constructed, but has been relatively stable since 2001. The water level data indicate that the falling water table in the vicinity of the cell probably is not part of a regional trend but is, instead, a local effect due to dissipation of the ground water mound beneath the disposal cell.

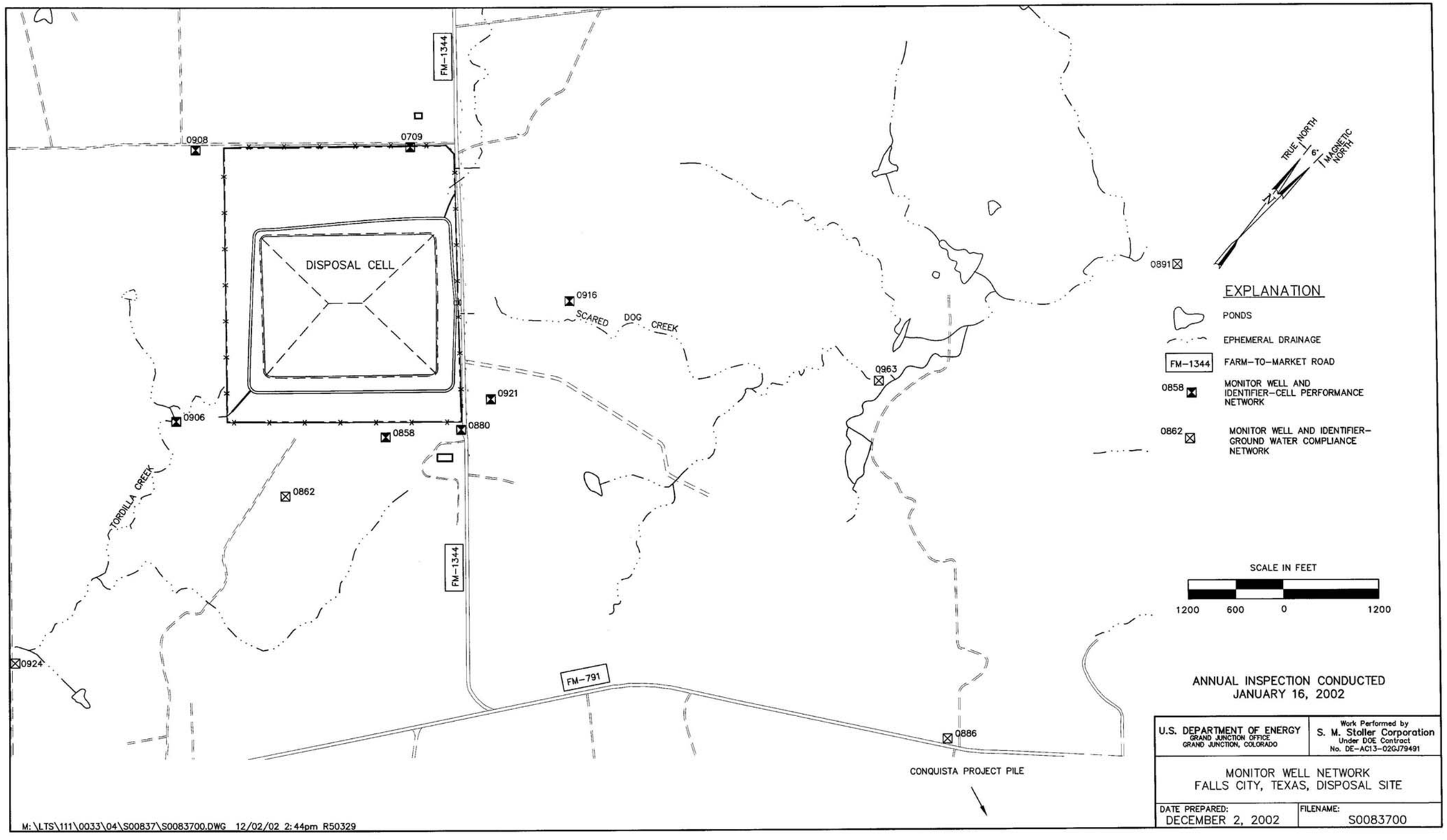

Figure 5–2. Monitor Well Network at the Falls City, Texas, Disposal Site

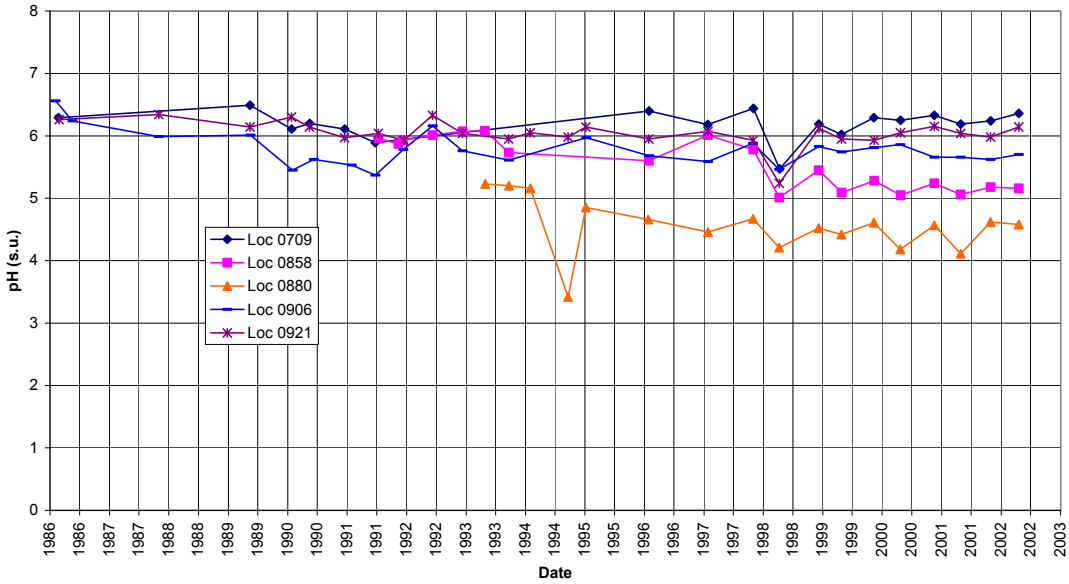

Figure 5−3. Plots of Ground Water pH at Cell Performance Monitor Well Locations at the Falls City, Texas, Disposal Site

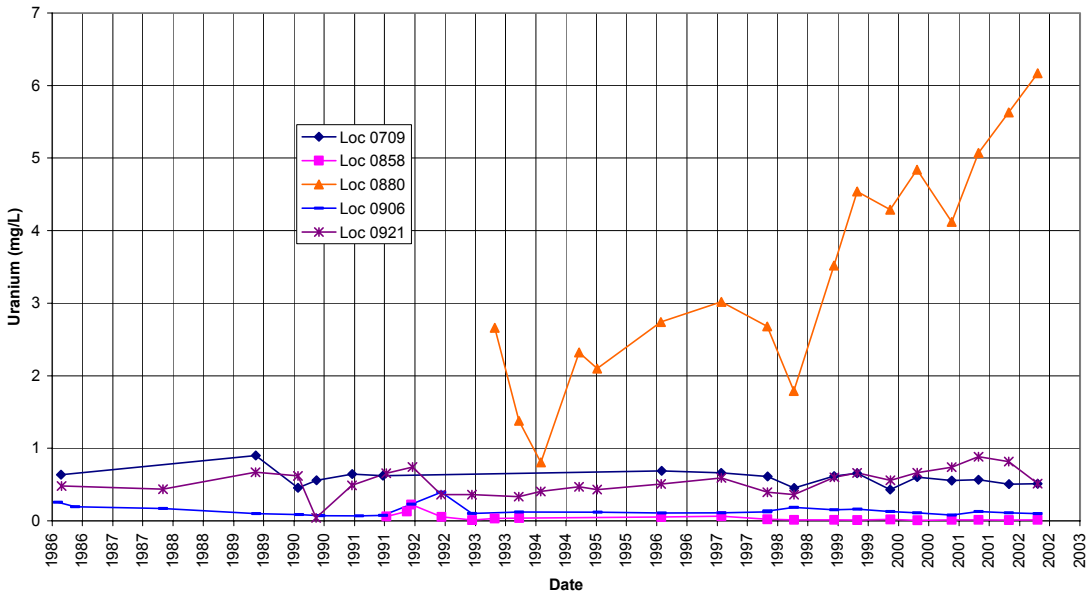

Figure 5−4. Time-Concentration Plots of Uranium in Ground Water at Cell Performance Monitor Well Locations at the Falls City, Texas, Disposal Site

Ground Water Compliance Monitoring—The U.S. Nuclear Regulatory Commission approved the Ground Water Compliance Action Plan for the Falls City site in 1998. The Plan requires monitoring downgradient of the legacy plumes of contaminated ground water through 2003.

Two legacy plumes were identified: (1) a plume east of the site was identified in the Conquista/Deweesville aquifer and the underlying Dilworth aquifer; and (2) a plume underlying the cell and extending to the south was identified in the Conquista/Deweesville aquifer, although elevated concentrations of some analytes had historically been observed in the Dilworth aquifer at well 0862. The plumes were identified where ground water pH exceeded 4.0.

The compliance monitoring network consists of five wells (0862, 0886, 0891, 0924, and 0963). Sample locations were selected on the basis of ground water flow direction from the two plumes. The wells are sampled annually and analyzed for 33 analytes, of which 10 have a standard specified in Table 1 to Subpart A of 40 CFR 192 (Table 5–2). Concentrations of cadmium, selenium, uranium, and activities of radium and gross alpha continue to exceed their respective standards in several wells. Analyte concentrations at most locations remained essentially constant. Plots of pH measurements and uranium concentrations are shown on Figures 5−5 and 5−6.

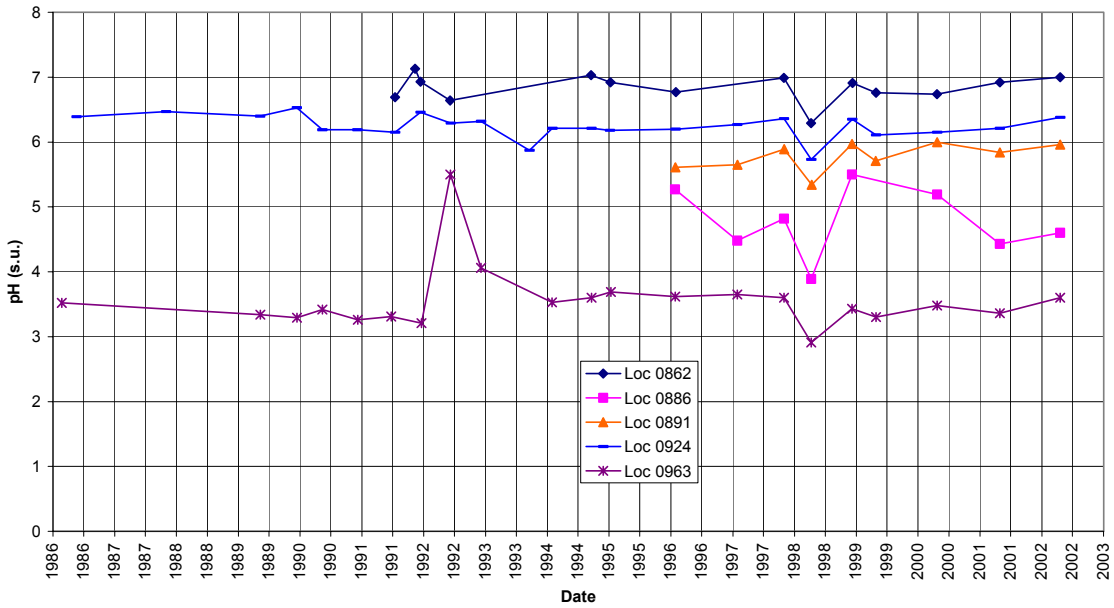

Figure 5−5. Plots of Ground Water pH at Compliance Monitor Well Locations at the Falls City, Texas, Disposal Site

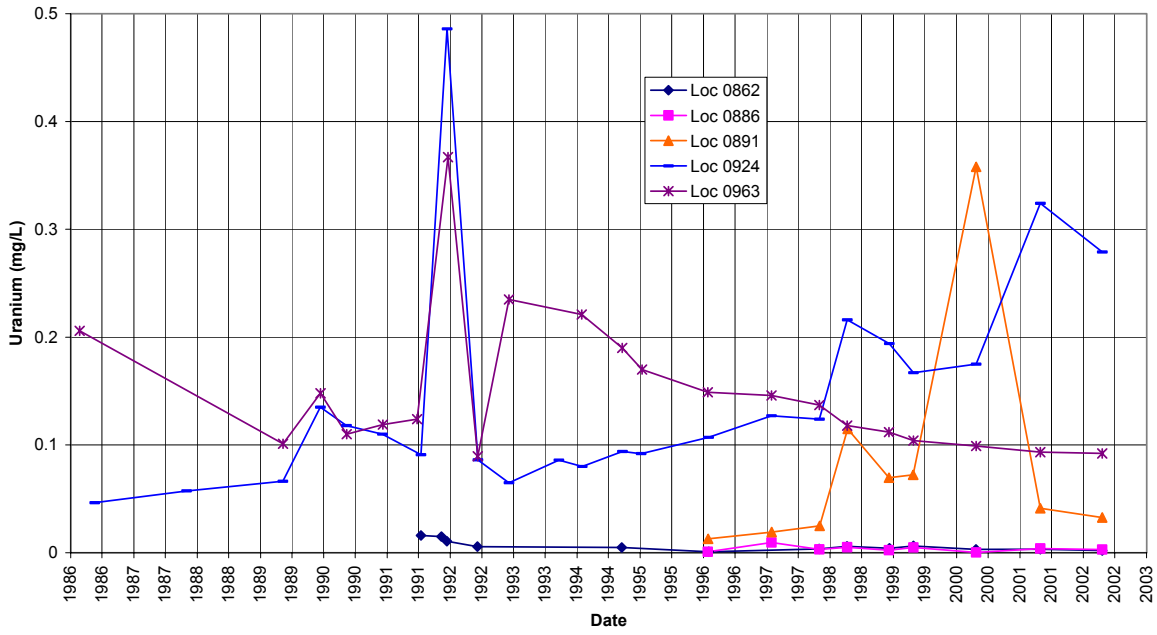

Figure 5−6. Time-Concentration Plots of Uranium in Ground Water at Compliance Monitor Well Locations at the Falls City, Texas, Disposal Site

Ground water levels at the compliance monitoring locations have remained essentially constant since monitoring began. Minor fluctuations in water level are likely caused by seasonal factors affecting recharge rates.

5.0 Corrective Action

Corrective action addresses out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2002.

6.0 Photographs

Table 5–3. Photographs Taken at the Falls City, Texas, Disposal Site

Photograph Location Number	Azimuth	Description
PL−1	215	Woody vegetation on southeast edge of cell top.
PL−2	0	New growth on previously treated vegetation.

PL−1. Woody vegetation on southeast edge of cell top.

PL−2. New growth on previously treated vegetation.

End of current section